

CLAIMS

What is claimed is:

- 5 1. A variable capacity rotary compressor, comprising:
a cylinder in which a refrigerant is compressed;
an inlet pipe to deliver the refrigerant into the cylinder;
an outlet pipe to deliver the refrigerant out of the cylinder;
a bypass hole provided at a predetermined position of the cylinder to bypass the
10 refrigerant from the cylinder, thus varying a compression capacity;
a bypass pipe connecting the bypass hole to the inlet pipe to allow the refrigerant
bypassed through the bypass hole to enter the cylinder; and
a cooling unit to cool the refrigerant flowing through the bypass pipe.
- 15 2. The variable capacity rotary compressor according to claim 1, further comprising a
pressure reducing unit to reduce a pressure of the refrigerant which flows through the bypass
pipe.
- 20 3. The variable capacity rotary compressor according to claim 2, wherein the pressure
reducing unit is provided on the bypass pipe between the cooling unit and the inlet pipe.
4. The variable capacity rotary compressor according to claim 3, further comprising a
control unit to control a flow of the refrigerant which flows through the bypass pipe.
- 25 5. The variable capacity rotary compressor according to claim 4, wherein the control unit

comprises:

a check valve to open or close the bypass hole;

a connection pipe to connect the outlet pipe to the bypass pipe; and

a three-way valve provided at a junction between the bypass pipe and the connection
5 pipe,

the bypass pipe comprising a first pipe portion between the bypass hole and the three-
way valve and a second pipe portion between the three-way valve and the inlet pipe,

and the three-way valve being controlled to allow the first pipe portion to communicate
with the second pipe portion or the connection pipe.

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6. The variable capacity rotary compressor according to claim 5, wherein, when the three-
way valve is controlled to allow the first pipe portion to communicate with the second pipe portion,
the check valve is opened to bypass the refrigerant through the bypass hole, thus executing a
small capacity compression mode, and when the three-way valve is controlled to allow the first
15 pipe portion to communicate with the connection pipe, the check valve is closed to execute a
large capacity compression mode.

7. The variable capacity rotary compressor according to claim 5, wherein the cooling unit
and the pressure reducing unit are provided at predetermined positions of the second pipe portion
20 of the bypass pipe.

8. A variable capacity rotary compressor, comprising:

a cylinder in which a refrigerant is compressed;

an inlet pipe to deliver the refrigerant into the cylinder;

25 an outlet pipe to deliver the refrigerant out of the cylinder,

a bypass hole provided at a predetermined position of the cylinder to bypass the refrigerant from the cylinder, thus varying a compression capacity;

a bypass pipe connecting the bypass hole to the inlet pipe to allow the refrigerant bypassed through the bypass hole to enter the cylinder; and

5 a pressure reducing unit to reduce a pressure of the refrigerant which flows through the bypass pipe.

9. The variable capacity rotary compressor according to claim 8, wherein the pressure reducing unit comprises a capillary tube.

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10. A refrigerant cycle system, comprising a compressor, a condenser, an expander, and an evaporator, the compressor comprising a variable capacity rotary compressor which comprises:

a cylinder in which a refrigerant is compressed;

15 an inlet pipe to deliver the refrigerant into the cylinder;

an outlet pipe to deliver the refrigerant out of the cylinder;

a bypass hole provided at a predetermined position of the cylinder to bypass the refrigerant from the cylinder, thus varying a compression capacity;

a bypass pipe connecting the bypass hole to the inlet pipe to allow the refrigerant
20 bypassed through the bypass hole to enter the cylinder; and

a cooling unit to cool the refrigerant flowing through the bypass pipe.

11. The refrigerant cycle system according to claim 10, wherein the cooling unit is provided at a predetermined portion of the condenser.

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12. The refrigerant cycle system according to claim 10, wherein the variable capacity rotary compressor further comprises a pressure reducing unit to reduce a pressure of the refrigerant which flows through the bypass pipe.

5 13. The refrigerant cycle system according to claim 12, wherein the pressure reducing unit is provided on the bypass pipe between the cooling unit and the inlet pipe.

14. The refrigerant cycle system according to claim 10, wherein the compressor further comprises a control unit to control a flow of the refrigerant which flows through the bypass pipe,
10 the control unit comprising:

a check valve to open or close the bypass hole;

a connection pipe to connect the outlet pipe to the bypass pipe; and

a three-way valve provided at a junction between the bypass pipe and the connection pipe.

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15. A refrigerant cycle system, comprising a compressor, a condenser, an expander, and an evaporator, the compressor comprising a variable capacity rotary compressor which comprises:

a cylinder in which a refrigerant is compressed;

20 an inlet pipe to deliver the refrigerant into the cylinder;

an outlet pipe to deliver the refrigerant out of the cylinder;

a bypass hole provided at a predetermined position of the cylinder to bypass the refrigerant from the cylinder, thus varying a compression capacity;

a bypass pipe connecting the bypass hole to the inlet pipe to allow the refrigerant
25 bypassed through the bypass hole to enter the cylinder; and

a pressure reducing unit to reduce a pressure of the refrigerant which flows through the bypass pipe.